APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/520,684	03/07/2000	Jonathan S. Turner	27776	9090

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EXAMINER
VOLPER, THOMAS E

ART UNIT	PAPER NUMBER
2697	6

DATE MAILED: 03/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/520,684	TURNER ET AL.
	Examiner	Art Unit
	Thomas Volper	2697

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-23_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-23_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _5_ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

U.S. Patent and Trademark Office

PTO-326 (Rev. 04-01)

Office Action Summary

Part of Paper No. 6

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1-5, 7, 9, 11, 12, 14, 19 and 20 are rejected under 35 U.S.C. 102(b) as being

anticipated by Fan (US 5,337,308).

- Regarding claim 1, Fan discloses a multi-stage switching system that uses sequence

control. Packets or cells arriving at the switching system enter the time stamp stage (10) where

they are stamped to indicate the time of arrival to establish cell sequence (col. 4, lines 58-62).

The time-stamped cells enter the input buffers (31) of the second stage, where a minimum time

stamp detector (34) is arranged to examine the time stamp values of cells in all of the input

buffers and to determine the earliest value. The cells with the earliest values are supplied to a

selector (35) that selects a cell and admits it to the self-routing switch (32) according to a

destination address of the desired output buffer (col. 6, lines 15-40). Fan also discloses that a

reference time stamp (RT) cell generator (37) generates an idle RT cell based on the minimum

time stamp value detected by detector (34). This RT cell is supplied to an output link of the

switching module (16) to be used by the third stage as a reference (latest) time stamp value (col.

6, lines 47-54). The third stage operates much the same way as the second stage, and uses this

reference time stamp value, which represents the "derived information" of the present invention, to select packets in sequence.

- Regarding claim 2, see paragraph regarding claim 1 above. The cells are time stamped to indicating the time of arrival at the switching system. They are then routed through the switching system to maintain this sequence.

- Regarding claim 3, the RT cell mentioned in the paragraph regarding claim 1 provides the status message that establishes a lower bound. This RT cell is used in the third stage to select the packets with the earliest time stamps, according to the method described for the second stage.

- Regarding claim 4, see paragraph regarding claim 2 above.

- Regarding claim 5, see paragraph regarding claim 1 above. More specifically, Fan demonstrates the method of claim 5 by the operation of a switching module (17). The RT cell mentioned in the paragraph regarding claim 1 represents the "specified value" of the present invention. No subsequent packets that enter the arrival buffers of the third stage will have a time stamp value earlier than this value because it was based on the earliest time stamp value detected at the previous stage.

- Regarding claim 7, Fan discloses that cells launched into self-routing switch (32) are routed according to their destination address to a desired output buffer (col. 6, lines 36-40).

- Regarding claim 9, see paragraph regarding claim 1 above. The RT cell is sent from a switch module in the second stage to a switch module in the third stage.

- Regarding claim 11, see paragraph regarding claim 1 above.

- Regarding claim 12, see paragraph regarding claim 1 above. Additionally, the cells stored in the foremost locations of the input buffers (31) represent the "candidate packets" of the

present invention. The cells having the minimum time stamp values as determined by the minimum time stamp value detector (34), i.e. which represent set of these candidate cells, are provided to the selector (35) that selects the cells in order of increasing time stamp value to be outputted to the self-routing switch (32) (col. 6, lines 25-31). The first stage includes an empty buffer detector (22) that detects empty output buffers of the first stage and informs RT cell generator of a "no cell condition" and supplies an RT cell, i.e. status message, to the output link. This cell is transmitted to the input buffers of the second stage, thus meeting the limitation of creating a new status message at the arrival buffers.

- Regarding claim 14, see paragraph regarding claim 7 above.

- Regarding claim 19, the paragraph regarding claim 12 above provides all of the limitations of claim 19, including control logic, which is represented by the workings of the minimum time stamp value detector (34) and the selector (35).

- Regarding claim 20, see paragraph regarding claim 14 above.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 6, 8, 16 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Holden (US 5,570,348).

- Regarding claims 6, 21 and 22, all the limitations of the base claims have been presented in the preceding 102(b) rejection based on Fan. Fan fails to disclose that the input buffers and output buffers of the switching element are operative to accept data packets of different priority classes. Holden discloses a switching system in which each switch element (40) asserts backpressure signals to each connection to each of its input interfaces on a per-input, per-priority basis (col. 8, lines 1-12). Each switch element also contains a multipriority buffer pool controller (MPBPC) (150) that controls the overall function of the switch element (40). Thus, the switch elements are able to handle different priority levels of data. At the time the invention was made, one of ordinary skill in the art would have been motivated to allow each switch element of the switching system of Fan to handle different priority levels of traffic in order to make it compatible with ATM traffic, which often uses different classes such as CBR, VBR and ABR that have different priorities when being routed through a switching system.

- Regarding claim 8, the backpressure signal mentioned in the previous paragraph regarding claims 6, 21 and 22 covers the limitation of postponing reception of data packets. This prevents cell loss at an input interface to a switch element that has no available cell memory (col. 7, lines 60-67).

- Regarding claim 16, Fan does not disclose transmitting either a departure data packet or a departure status message to a plurality of downstream switch elements. Holden discloses multicasting within each switch element. An array of multicast group bits represents the output ports to a switch element. Any bits that are set in the selected word within a multicast group correspond to the switch element outputs in which the cell is to be placed (col. 12, lines 28-38). At the time the invention was made, one of ordinary skill in the art would have been motivated to

include this multicast feature in the switching system of Fan to use the system in a video

conference whereby several workstations are connected by a switch fabric and voice and image

data are transmitted from each workstation to each of the other workstations.

- Regarding claim 23, Fan does not disclose transmitting a packet prior to another packet

based on priority, even if it has a later timestamp. Holden discloses that the high priority traffic

is impeded last as the available memory in a switch element decreases. The thresholds are set so

that high priority traffic has strict priority over lower priority traffic (col. 9, lines 3-7). This

implies that a higher priority packet would be sent before a lower priority packet. At the time the

invention was made, one of ordinary skill in the art would have been motivated to implement

priority based service precedence over time stamp order in the switching system of Fan. One of

ordinary skill in the art would have been motivated to do this if CBR and ABR traffic were using

the same switching network. CBR traffic has a guarantee associated with it, and according to

ATM standards CBR traffic would be given service precedence regardless of time stamp age if it

were in contention with ABR traffic at the same switch element.

5.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US

5,337,308) in view of Toy et al. (US 4,630,260).

-     Regarding claim 10, Fan discloses all the limitations of claim 5, upon which claim 10

depends. Fan also discloses that the RT cells are transmitted on the same paths as the data

packets, which is evident in the 102(b) rejection above. The RT cells contain information

necessary for controlling the sequence of data packets, thus they represent control packets. Fan

does not disclose that the switching element includes first and second groups of arrival and

departure buffers. Toy discloses a switching system in which the switch elements comprise two incoming links and two outgoing links. Each of these links further comprises two sublinks (col. 5, lines 5-12; see also Fig. 7). At the time the invention was made, a person of ordinary skill in the art would have been motivated to implement this structure in the switching system of Fan in order to provide multipath capability through the network.

6.   Claims 15, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Holden (US 5,570,348) and Toy et al. (US 4,630,260).

- Regarding claims 15 and 17, Fan discloses all of the limitations all of the limitations of claims 15 and 17 as described in the previous 102(b) rejection of claim 12, except for either sending a grant signal to an upstream neighbor, or receiving a grant signal from a downstream neighbor prior to the sending of either a data packet or status message. Toy discloses a switching system wherein upon receipt of a packet at the input control (703) of a switch node (201-3) a request signal is sent to an arbiter (735) which relays the signal to the output interfaces (736 and 737). Once one of the output interfaces responds with a grant signal, the arbiter relays this grant signal back to input control which commences transfer of the packet (col. 6, lines 18-38). As explained in the previous paragraphs regarding claim 8, Holden discloses a backpressure signal transmitted from one switch element to an upstream switch element to halt sending of packets in the case of a full cell memory at an input interface. Although Toy discloses sending grant messages from output to input inside a switch element, it would have been obvious to send grant messages from an input of one switch element to an output of an upstream switch element. Holden provides the motivation for transmitting flow control type signals between switch

elements. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to transmit a grant signal from a downstream element to and upstream element prior to sending a packet or status message, embodied by the RT cell of Fan. One of ordinary skill in the art would have been motivated to do this in order to eliminate cell loss by allowing an upstream element to send a packet or status message only when the downstream element had enough room in its input buffers.

- Regarding claim 18, the previous paragraph regarding claims 15 and 17 also meets all of the limitations of claim 18 except that Fan also fails to disclose that the request signal includes a time stamp value of a data packet that the upstream neighboring switch element is prepared to transmit. At the time the invention was made, it would have been obvious to use the RT cell as the request message provided by the teaching of Fan in view of Holden and Toy et al. One would have been motivated to do this because the RT cell contains the minimum time stamp value detected in any of the packets in an upstream stage, which would be the age of the next packet the upstream element would want to transmit downstream in order to maintain packet sequence.

7.   Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Abali et al. (US 5,721,820).

- Regarding claim 13, Fan discloses all of the limitations of claim 13 except that the departure buffer is selected based on the occupancy of the buffers. Abali discloses a switching system wherein each switch has route control logic that selects an unused output port from the set of possible outputs (col. 5, lines 43-53). At the time the invention was made it would have

been obvious to use this routing feature of Alabi in the switching system of Fan. One of ordinary skill in the art would have been motivated to do this in order to prevent congestion at a switching element.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Wills (US 6,011,779) ATM Switch Queuing System

- Verhille et al. (US 5,491,728) Cell Resequencing System for a Telecommunication Network

- Nederlof (US 5,483,523) Resequencing System

- Wolker et al. (US 5,784,357) Packet Switching System

- Therasse et al. (US 5,414,705) Resequencing Device for a Node of a Cell Switching System

9.   Any inquiry concerning this communication, or earlier communications from the examiner should be directed to Thomas Volper whose telephone number is 703-305-8405 and fax number is 703-746-9467. The examiner can normally be reached between 9:00am and 6:30pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo, can be reached at 703-305-4798. Any inquiry of a general nature or

relating to the status of this application or proceeding should be directed to the receptionist

whose telephone number is 703-305-4750.

tev

March 22, 2003

RICKY NGO
PRIMARY EXAMINER